FROM :VP ENGINEERING 206 234 9941 2001.09-07 13:53 #512 P.01/02

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Fax No 912-965-3367	Telephone No.	Fax No.	Telephone No.
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Robert H. Kelley-Wickemeyer
Chief Engineer
Safety & Certification
A/P Performance & Propulsion

The Boeing Company
P.O. Box 3707 MC 67-WH
Seattle, WA 98124-2207

September 7, 2001

Mr. Larry Hanson
Chairman L&D HWG
Gulfstream Aerospace Corporation, M/S D-04
500 Gulfstream Road or PO Box 2206
Savannah, Georgia 31402-2206

BOEING

Dear Mr. Hanson:

Reference: Economic Evaluation of ARAC Proposed NPRMs and Advisory Circulars, dated August 27, 2001

The Boeing Company has been asked to respond to the Reference by accepting or rejecting the Loads and Dynamics Harmonization Working Group (L&D HWG) recommendations pertaining to qualitative economic evaluations of four proposed regulations which are in the NPRM stage. Two of the proposals are accepted and two rejected by Boeing.

The Boeing Company accepts the L&D HWG recommendations for both the Revised Requirements for Gust and Continuous Turbulence Design Loads, 25.341, and for the Checked Pitch Maneuver Requirement for Transport Airplanes, 25.331. Boeing believes that changes to the loads requirements that result from these NRPM's will not result in significant costs for certification or manufacturing. In addition, there should be no significant increases in weight.

However, Boeing cannot agree that replacing a special condition (that has not been through an economic evaluation) is an adequate justification for qualitatively saying that there will be no impact for these rules. Special Conditions are law, but they have not passed through the due process hurdles of an Economic analysis. For this reason, Boeing must reject the proposal for both Engine and Auxiliary Power Unit Load Conditions /Engine Failure 25.361 and 25.362, and for Interaction of Systems and Structures 25.302. Both of these proposals would drive additional costs onto an airplane if the special conditions did not exist.

Very truly yours,

R H Kelley-Wickemeyer

Robert H. Kelley-Wickemeyer
Chief Engineer - Safety and Airworthiness
Airplane Performance and Propulsion
Phone: 425-234-9984
robert.h.kelley-wickemeyer@boeing.com

Handout 10

Cessna
A Textron Company

September 4, 2001

Larry Hanson
Chairman L&DHWG
Gulfstream Aerospace Corporation M/S D-04
500 Gulfstream Rd
Savannah, GA 31402-2206

RE: Economic Evaluation of ARAC proposed NPRMs and Advisory Circlars

Dear Larry:

We have reviewed the economic evaluation questionnaires you forwarded to my attention on August 27, 2001.

We concur with the findings documented in those questionnaires.

Sincerely,

Robert L. Howes
Manager, Engineering
Member L&DHWG

Nick Anderson
Section Chief, Airworthiness

RLH:dgs

Gulfstream
A GENERAL DYNAMICS COMPANY

Date: September 4, 2001

Larry Hanson
Chairman Loads &Dynamics HWG
Gulfstream Aerospace

A&C- FAA-01-220

Subject: Economic Evaluation of ARAC proposed NPRMs and Advisory Circulars
Reference: Your letter dated August 27,2001, same subject

Dear Larry:

Per your referenced letter, Gulfstream understands that the FAA has asked the L&D HWG to complete an economic evaluation of the proposed standards for four ARAC projects.

Gulfstream has reviewed and concurs with each of the economic evaluations for the four FAA projects as defined in the following ARAC L&DHWG responses.

1. Engine and Auxiliary Power Unit Load Conditions / Engine Failure 25.361 and 25.362 - NPRM and Advisory Circular.

2. Revised Requirements for Gust and Continuous Turbulence Design Loads 25.341 and associated paragraphs – NPRM and Advisory Circular

3. Interaction of Systems and Structures 25.302 – NPRM

4. Checked Pitch Maneuver Requirement for Transport Airplanes 25.331 – NPRM

It should be noted that these economic assessments do not take into account the impacts these later certification requirements may have on aircraft certification programs subject to the new FAR 21.101 changed products rule requirement. The level of economic impact and impracticality of applying these rules to existing programs would have to be performed under the criteria defined by FAR 21.101 and AC 21.101-1.

Sincerely,

Richard J. Trusis, Manager
Airworthiness, Certification, & Data Management

cc: R. Johnson, VP - Chief Engineer

Z2

Date: September 5, 2001

To: Loads & Dynamics HWG - Laurence C. Hanson, Chairman

Learjet Inc.
P.O. Box 7707
Wichita, KS 67277-7707 United States
Telephone 1(316) 946-2000
http://www.aerospace.bombardier.com

Subject: Checked Pitch Maneuver Requirement for Transport Airplanes 25.331 – NPRM

A review of the subject NPRM and economic evaluation questionnaire have been made by Learjet Loads and Dynamics resulting in the following conclusion:

For Learjet Designs the additional effort will not result in a large economic impact. This is due to that it replaces JAA special conditions and is harmonized with existing analysis methods.

Abe Jibril

Z2

Date: September 5, 2001

To: Loads & Dynamics HWG - Laurence C. Hanson, Chairman

Learjet Inc.
P.O. Box 7707
Wichita, KS 67277-7707 United States
Telephone 1(316) 946-2000
http://www.aerospace.bombardier.com

Subject: Revised Requirements for Gust and Continuous Turbulence Design Loads 25.341 and associated paragraphs – NPRM and Advisory Circular

A review 0f the subject economic evaluation questionnaire has been made by Learjet Loads and Dynamics area and resulted in the following conclusion:
For Learjet Designs the additional effort will not result in a large economic impact. This is due to that it replaces existing JAA special conditions and existing analysis methods.

Abe Jibril

Z 2

Date: September 5, 2001

To: Loads & Dynamics HWG - Laurence C. Hanson, Chairman

Learjet Inc.
P.O. Box 7707
Wichita, KS 67277-7707 United States
Telephone 1(316) 946-2000
http://www.aerospace.bombardier.com

Subject: Economic Evaluation 'Engine and Auxiliary Power Unit Load Conditions /Engine Failure 25.361 and 25.362 -NPRM and Advisory Circular.

A review of the subject economic evaluation questionnaire has been made by Learjet Loads and Dynamics area resulting in the following conclusion:

For Learjet Designs the additional effort will not result in a large economic impact. This is due to that it replaces existing special conditions and existing analysis methods.

Abe Jibril

Z2

Date: September 5,2001

Subject: Interaction of Systems and Structures 25.302 – NPRM

Learjet Inc.
P.O. Box 7707
Wichita, KS 67277-7707 United States
Telephone 1(316) 946-2000
http://www.aerospace.bombardier.com

A review of the subject NPRM and economic evaluation questionnaire
have been made by the appropriate structural areas resulting in the
following conclusions:

1. The additional effort needed to meet the system design, loads, flutter, static and residual strength requirement is significant (10 % to 15% increase).
2. For Learjet Designs the additional effort will not result in a large economic impact. This is due to the few fly by wire systems they contain.

Abe Jibril

Lockheed Martin Aeronautical Systems
86 South Cobb Drive Marietta, GA 30063

LOCKHEED MARTIN

September 5, 2001

Mr. Laurence Hanson, Chairman
ARAC Loads and Dynamics
Harmonization Working Group

Subject: Economic Evaluation of ARAC Proposed NPRMs and Advisory Circulars

The Economic Evaluation report and associated NPRM and Advisory Circular for the following proposed FAR 25 revisions have been reviewed by the Lockheed Martin Aeronautics Company C-130 Structures Office.

1. Engine and Auxiliary Power Unit Load Conditions/Engine Failure 25.361 and 25.362 – NPRM and Advisory Circular.
2. Revised Requirement for Gust and Continuous Turbulence Design Loads 25.341 and associated paragraphs – NPRM and Advisory Circular.
3. Interaction of Systems and Structures 25.302 – NPRM.
4. Checked Pitch Maneuver Requirement for Transport Airplanes 25.331 – NPRM.

The LM-Aero C-130 Structures Office concurs with the consensus of the ARAC Loads and Dynamics Harmonization Working Group that these revisions "will result in no significant change to manufacturer's cost".

W.E. Barron
C-130 Chief Structures Engineer

Raytheon

Raytheon Aircraft Company
9709 E. Central
P.O. Box 85
Wichita, Kansas
67201-0085 USA

General

September 5, 2001

In Reply Refer To: 940-2001-09-077

Mr. Larry Hanson
Chairman, ARAC Loads and Dynamics Harmonization Working Group
Gulfstream Aerospace Corporation, M/S D-04
500 Gulfstream Rd/P.O. Box 2206
Savannah, GA 31402-2206

Subject: Economic Evaluation of ARAC Proposed NPRMs and Advisory Circulars

Ref.: Your email of August 27, 2001 on the subject matter to Jagannath Giri.

Dear Mr. Hanson:

RAC has reviewed and evaluated the economic impacts of the ARAC proposed NPRM's and the Advisory Circulars transmitted through your email and listed below.

1. Engine and Auxiliary Power Unit Load Conditions /Engine Failure: 14 CFR Part 25.361 and 25.362 - NPRM and Advisory Circular (with a note that GE and Pratt & Whitney are separately being asked to comment on this engine-related material).

2. Revised requirements for Gust and Continuous Turbulence Design Loads 14 CFR Part 25.341 and associated paragraphs – NPRM and Advisory Circular.

3. Interaction of Systems and Structures 14 CFR Part 25.302 – NPRM.

4. Checked Pitch Maneuver Requirement for Transport Airplanes 14 CFR Part 25.331 – NPRM.

RAC accepts all the Economic Evaluation Questionnaires completed by the L&DHWG; however, RAC also offers the following comments:

1. For small business class airplane manufacturers like RAC, the burden and cost of meeting the added requirements, mainly to address the products and requirements of the large transport category aircraft makers, is considered significantly high. A point may be reached whereby the additional costs could increase the product price to a level that the market cannot sustain. This would lead to eliminating some smaller classes of aircraft from the market.

2. RAC reviewed the Revised Requirements for Gust and Continuous Turbulence Design Loads 14 CFR Part 25.341 with Associated Paragraphs – NPRM and AC, as well as the Checked Pitch Maneuver Requirements for Transport Airplanes 14 CFR Part 25.331 – NPRM, and the requirements are considered acceptable, as they indicate minimal cost increases.

3. For the Engine Failure Loads 14 CFR Part 25.361 and 25.362, the cost discussion states that the NPRM replaces the existing manufacturer's analysis and test techniques. For the type of aircraft that RAC manufactures, the added cost and weight penalty could be very high in comparison to the added safety considerations.

4. The requirements for the Interaction of Systems and Structures 14 CFR Part 25.302 – NPRM, as defined, will add significant new analysis, including non-linear analysis of control systems, inclusion of system effectiveness and system reliability, plus a consideration for the joint probability of structural failures. These additions will result in considerable added cost for RAC category and size of aircraft.

Sincerely yours,

RAYTHEON AIRCRAFT COMPANY

John Tigue, Acting Director
Product Design Assurance & FAA Liaison

JT:jg

GE Aircraft Engines
One Nuemann Way
Cincinnati, OH
45215-1988

Subject: Economic Evaluation of ARAC proposed NPRM and Advisory Circular
FAR 25.361 Engine Torque & 25.362 Engine Failure Loads

Larry Hanson, Chairman L&D HWG
Gulfstream Aerospace Corporation M/S D-04
500 Gulfstream Rd or PO Box 2206
Savannah, GA 31402-2206

GEAE does not foresee any additional costs resulting from the proposed changes to FAR 25.361.

The major impact to GEAE will be from the proposed new Rule and AC 25.362. The proposed new rule and AC requires engine mount loads to be generated in conjunction with the airframes from a dynamic analysis using a validated, integrated dynamic airframe / engine model. We are already doing this for all new engine/airframe programs in order to comply with "issue papers" or "special conditions" imposed by regulators (FAA & others). This however does require considerable additional work and represents a significant cost when compared to what must be done to comply with the current FAR's.

GEAE "owns" the engine mounts for many of the application in which our engines are used. They are part of the engine and therefore must be designed and manufactured to support FAR 33 certification. Because the proposed new rule 25.362 requires that loads used for FAR 25 certification be obtained from a validated, integrated engine / airframe model, these loads are not likely to be available until after the mount hardware design is frozen and hardware manufactured for FAR33 certification and airframe compliance tests. This is particularly true where there is a new airframe and engine that relies on the FAR 33 engine fan blade out test to provide data for the model validation. This could potentially result in having to redesign the mount hardware in order to comply with the proposed new rule and AC at a significant cost to the program.

Although GEAE technically supports the proposed changes, for the reason's stated above, GEAE does not see the changes proposed as having "no significant change to manufacturer's cost", as stated in the Economic Evaluation Questionnaire, or that "the requirements of the proposed rule will not impose additional costs on U.S. manufacturers of part 25 airplanes", as stated in the NPRM, when comparing the cost of complying with FAR 25- as currently written to that required to comply with the introduction of the proposed new FAR & AC 25.362.

Sincerely,

9/7/01

Tom Joseph
Mgr., Engine Mounts
Design Engineering
513-243-1388

Larry Bach
Mgr., Engine Dynamics
Structures Systems Analysis
513-243-2474

Andy May
FAA-DER Industry &
Regulatory Affairs Liaison
513-243-3878

Pratt & Whitney
400 Main Street
East Hartford, CT 06108

Pratt & Whitney
A United Technologies Company

August 31, 2001

Mr. Larry Hanson, Chairman L&D HWG
Gulfstream Aerospace Corporation M/S D-04
500 Gulfstream Road
Savannah, GA 31402-2206

Dear Larry:

Pratt & Whitney accepts the Economic Evaluation of the proposed NPRM and Advisory Circular for Engine and Auxiliary Power Units/Engine Failure that were developed and submitted to the FAA through the ARAC process.

Please feel free to contact me if there are any questions.

Sincerely,

Frank Stadmeyer

Frank Stadmeyer
Assistant Manager
Flight Safety, Certification and Airworthiness

FS:jb

003/jb

cc: C. Bolt
M. Romanowski